Exam 3

Student Name:_____

Student ID#:_____

Each problem is worth 5 points. Give a <u>complete</u> solution to receive the full credit!

1. Find the values of trigonometric functions $\sin\theta$, $\tan\theta$, $\cot\theta$, $\csc\theta$, and $\sec\theta$ if you know that $\cos\theta = -\frac{6}{11}$, and θ is in the third quadrant.

2. Verify the following trigonometric identity:

$$\frac{\sec x - \cos x}{\tan x} = \sin x.$$

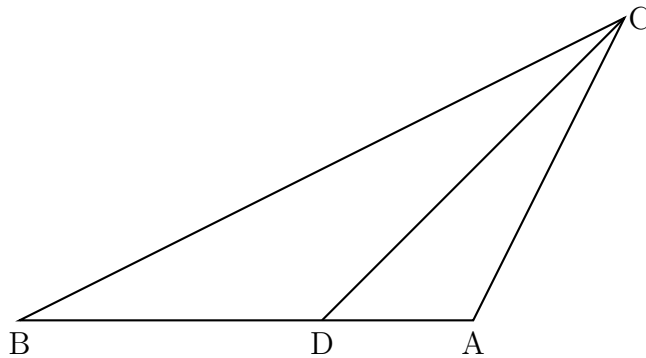3. For any acute angles α and β for which $\cos\alpha\cos\beta \neq 0$, show that

$$\frac{\cos(\alpha + \beta)}{\cos\alpha\cos\beta} = 1 - \tan\alpha\tan\beta.$$

4. Prove that

$$\cos^2\beta - \cos^2\alpha = \sin(\alpha + \beta)\sin(\alpha - \beta).$$
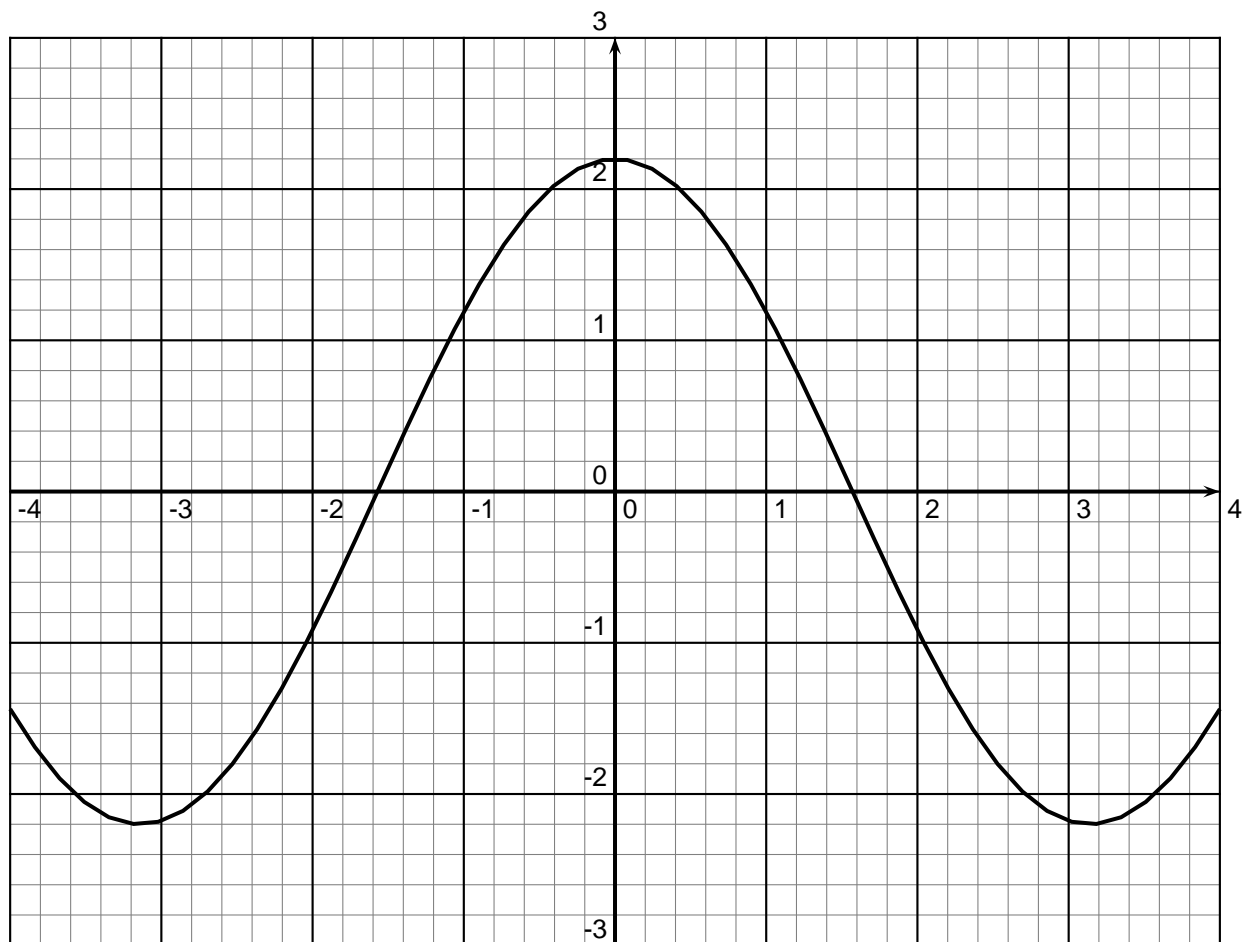
5. In a triangle $\triangle ABC$, angle $\angle BCA$ measures $60°$. Show that $c^2 = a^2 + b^2 - ab$.

6. For the triangle shown, find the length AD. Assume $BD = CD = 19$, $\angle CBD = 30°$, and $\angle DCA = 20°$.

7. If $\sin \alpha = \frac{7}{25}$ and $\cos \alpha$ is positive, find $\cos 2\alpha$.

8. The graph of a sine curve is given below.

(a) Determine the amplitude of the curve.

(b) Determine the period of the curve.

(c) Determine the phase shift of the curve.

(d) Determine the function in the form $f(x) = a\sin(k(x - b))$.

9. Sketch 2 periods of the graph of

$$y = \cot(2012(x + \frac{\pi}{2})).$$

Label the asymptotes and the x-intercepts.

10. Find the area of the shaded region in the figure where $\alpha = \frac{\pi}{3}$ and b=11.